

Amendment to the Claims – Current Status of Claims

1. (Currently Amended) A method of forming a lithographic template comprising the steps of:

providing a substrate, the substrate having an uppermost surface;

~~providing a directly patternable patterning layer~~ providing an irradiation sensitive and directly patternable patterning layer supported by the substrate; and

directly patterning the ~~directly patternable~~ irradiation sensitive and directly patternable patterning layer with a radiation source thereby forming a ~~directly patternable patterned imageable relief layer having a final template~~ relief structure consisting of the irradiation sensitive and directly patternable patterning layer.

2. (Original) A method for forming a lithographic template as claimed in claim 1, wherein the step of providing a substrate is further characterized as providing a substrate of one of a semi-transparent material or a transparent material.

3. (Currently Amended I) A method of forming a lithographic template as claimed in claim 2 further including the step of providing a charge dissipation layer adjacent the irradiation sensitive and directly patternable patterning layer, the irradiation sensitive and directly patternable patterning layer and the charge dissipation layer formed on the surface of the substrate.

4. (Currently Amended) A method of forming a lithographic template as claimed in claim 3 wherein the step of providing a charge dissipation layer adjacent the irradiation sensitive and directly patternable patterning layer includes forming the charge dissipation layer on an uppermost surface of the irradiation sensitive and directly patternable patterning layer, the irradiation sensitive and directly patternable patterning layer formed on the uppermost surface of the substrate.

5. (Original) A method of forming a lithographic template as claimed in claim 4 wherein the step of providing a charge dissipation layer includes forming the charge dissipation layer of a material chosen from the group consisting of: aluminum (Al), copper (Cu), polyaniline, and a charge dissipating conducting material.

6. (Currently Amended) A method of forming a lithographic template as claimed in claim 4 further including the step of forming a contrast enhancement layer between the substrate and the irradiation sensitive and directly patternable patterning layer.

7. (Original) A method of forming a lithographic template as claimed in claim 6 wherein the contrast enhancement layer is a material chosen from the group of chrome oxide (CrO), chrome nitride (CrN), titanium oxide (TiO), aluminum oxide (Al_2O_3), or aluminum nitride (AlN), or combinations thereof.

8. (Currently Amended) A method of forming a lithographic template as claimed in claim 3 wherein the step of providing a charge dissipation layer adjacent the irradiation sensitive and directly patternable patterning layer includes forming the charge dissipation layer between the substrate and the irradiation sensitive and directly patternable patterning layer.

9. (Original) A method of forming a lithographic template as claimed in claim 8 wherein the step of providing a charge dissipation layer includes forming a charge dissipation layer of a material chosen from the group consisting of: indium-tin-oxide (ITO), indium oxide, tin oxide, zinc oxide, cadmium oxide, copper aluminum oxide, copper gallium oxide, cadmium tin oxide, a transparent conducting material, a semi-transparent conducting material, and combinations thereof.

10. (Currently Amended) A method of forming a lithographic template as claimed in claim 9 wherein step of forming the charge dissipation layer between the substrate and the irradiation sensitive and directly patternable patterning layer includes forming the charge dissipation layer to include contrast enhancement properties.

11. (Currently Amended) A method of forming a lithographic template as claimed in claim 1 wherein the irradiation sensitive and directly patternable patterning layer is formed of an imageable transparent dielectric.

12. (Original) A method of forming a lithographic template as claimed in claim 11 wherein the imageable transparent dielectric is an imageable oxide.

13. (Original) A method of forming a lithographic template as claimed in claim 12 wherein the imageable oxide is hydrogen silsesquioxane (HSQ).

14. (Original) A method of forming a lithographic template as claimed in claim 11 wherein the imageable transparent dielectric is an imageable nitride.

15. (Original) A method of forming a lithographic template as claimed in claim 11 wherein the imageable transparent dielectric is an imageable oxynitride.

16. (Currently Amended) A method for forming the lithographic template as claimed in claim 11 wherein the step of patterning the irradiation sensitive and directly patternable patterning layer includes patterning with an electron beam source.

17. (Currently Amended) A lithographic template comprising:
a substrate having an uppermost surface; and
a irradiation sensitive and directly patternable ~~patterned imageable relief patterning~~ layer defining a relief structure supported by the uppermost surface of the substrate.

18. (Original) A method of forming a lithographic template as claimed in claim 17 wherein the substrate is formed as one of a transparent substrate or an opaque substrate.

19. (Original) A lithographic template as claimed in claim 18 wherein the transparent substrate is further characterized as one of a quartz material, a polycarbonate material, a calcium fluoride (CaF_2) material, a magnesium fluoride (MgF_2) material, or a pyrex material.

20. (Currently Amended) A lithographic template as claimed in claim 17 further including a charge dissipation layer formed between the substrate and the irradiation sensitive and directly patternable ~~patterned imageable relief~~ patterning layer.

21. (Original) A method of forming a lithographic template as claimed in claim 20 wherein the charge dissipation layer includes contrast enhancement properties.

22. (Original) A lithographic template as claimed in claim 20 wherein the charge dissipation layer is formed of a transparent conducting oxide.

23. (Original) A lithographic template as claimed in claim 22 wherein the charge dissipation layer is formed of a material chosen from the group consisting of:

indium-tin-oxide (ITO), indium oxide, tin oxide, zinc oxide, cadmium oxide, copper aluminum oxide, copper gallium oxide, cadmium tin oxide, and combinations thereof.

24. (Currently Amended) A lithographic template as claimed in claim 17 further including a contrast enhancement layer formed between the substrate and the irradiation sensitive and directly patternable ~~patterned imageable relief patterning~~ layer.

25. (Currently Amended) A lithographic template as claimed in claim 17 wherein the directly patternable ~~patterned imageable relief patterning~~ layer is formed of an imageable transparent dielectric material.

26. (Original) A lithographic template as claimed in claim 25 wherein the imageable transparent dielectric material is an imageable oxide.

27. (Original) A lithographic template as claimed in claim 25 wherein the imageable oxide is hydrogen silsesquioxane (HSQ).

28. (Original) A lithographic template as claimed in claim 25 wherein the imageable transparent dielectric material is an imageable nitride.

29. (Original) A lithographic template as claimed in claim 25 wherein the imageable transparent dielectric material is an imageable oxynitride.

30. (Currently Amended) A method for making a device comprising the steps of:

providing a substrate;

coating the substrate with a material layer characterized as deformable in response to a pressure applied thereto;

fabricating a lithographic template, wherein the lithographic template comprises;

a substrate having an uppermost surface; and

a irradiation sensitive and directly patternable ~~patterned-imageable~~ relief patterning layer defining a relief structure supported by the uppermost surface of the substrate;

positioning the lithographic template in contact with the material layer, the material layer being between the template and the substrate;

applying pressure to the template, the material layer thereby deforming into the relief pattern on the template; and

removing the template from the substrate.

31. (Original) A method for making a device as claimed in claim 30 wherein the material layer is a radiation sensitive material layer.

32. (Original) A method for making a device as claimed in claim 30 wherein the radiation sensitive material layer is further characterized as a photocurable material layer.

33. (Original) A method for making a device as claimed in claim 30 further including the step of transmitting radiation through the lithographic template to expose at least a portion of the radiation sensitive material layer on the substrate, thereby further affecting the pattern in the radiation sensitive material layer

34. (Original) A method for making a device as claimed in claim 33 wherein the step of transmitting radiation through the lithographic template is further characterized as transmitting ultraviolet light through the lithographic template.

35. (Original) A method for making a device as claimed in claim 33 wherein the step of transmitting radiation through the lithographic template is further characterized as transmitting deep ultraviolet light through the lithographic template.

36. (Original) A method for making a device as claimed in claim 30 wherein the device is one of a semiconductor device, a microelectronic device, a micro electro mechanical device, a photonic, an optoelectronic, or a microfluidic device.

37. (Currently Amended) A method for forming a lithographic template as claimed in claim 1, wherein the step of directly patterning the irradiation sensitive and directly patternable patterning layer with a radiation source includes the step of applying a developer solution to the irradiation sensitive and directly patternable patterning layer subsequent to the application of radiation by the radiation source.